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# Red Land    Black Land

**Teaching Ancient Egyptian History Through Game-based Learning**

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For years, researchers have discussed the educational potential of digital games (Prensky 2006). It is only within the very recent past that these discussions have started to bear fruit in the form of thoughtful serious game development and published research (Gee 2003, Gee 2005, Prensky 2006, Bogost 2007). While serious games have been used in domains such as healthcare, the military, STEM learning, and language training, there are few instances of games being used to teach cultural heritage. There are even fewer examples of games being used to seriously explore and teach archaeology (methodologically, epistemologically, and disciplinarily). This is rather puzzling as, given its well worn narratives of exploration and discovery, archaeology is a domain that is well suited to serious games. This is to say nothing about the actual process of archaeological excavation which, from the perspective of game design, seems tailor made as a game mechanic.

This is not to say that there aren't examples of archaeologically oriented serious games. However, they are very much in the minority compared to other domains that have received attention in the world of serious game design. Those archaeological serious games that do exist are most often geared towards younger audiences, and simply do not address the more complex and thought provoking questions that archaeologists ask, such as the nature of complex culture change, the impact of the environment on human populations (and vice versa), and the causes and consequences of social collapse.

There are certainly many instances of mainstream commercial games using archaeology and archaeologists as central themes. This is not particularly surprising, as archaeology and archaeologists are universally recognized in popular culture as being synonymous with adventure, danger, mystery, and exotic locales. For the most part, however, mainstream archaeologically oriented games play on well worn stereotypes of archaeology, archaeologists, and the human past: 19th century imperialistic European adventurers, unilinear and ethnocentric models of cultural development, and a variety of pseudoarchaeological tropes such as ancient aliens and the atleantean roots of all ancient states. (Watrall 2002, Watrall 2003) Narratives of discovery are quite common to scholarly archaeological work, but, as Breger (2008:56) argues, archaeology in mainstream video games have narratives which "follow a relatively unquestioned logic of appropriation" rather than careful excavation or research. Few games, if any, depict archaeology as a complex and deeply interdisciplinary social science that studies

human activity (both past and present) through the lens of material culture. Fewer still attempt to communicate that the primary goal of archaeology is keenly focused not on description, but on building generalizable theory which explains diachronic human behavior.

The result of this state of affairs is that while many archaeologically inspired games have high production values (and are often quite entertaining from a gameplay perspective), they are hardly appropriate for either teaching or understanding the nature of archaeology or the complex and highly relevant questions that archaeologists are engaged in exploring through their research.

It is this general context which served to motivate, inform, and shape the *Red Land/Black Land: Teaching Ancient Egyptian History Through Game-based Learning* project discussed herein

## PROJECT INTRODUCTION & GOALS

Developed at Michigan State University's MATRIX: The Center for the Arts, Letters, and Social Science Online, the focus on the Red Land/Black Land project was to create a robust *Civilization V* ([http://www.firaxis.com/games/game_detail.php?gameid=41](http://www.firaxis.com/games/game_detail.php?gameid=41)) mod which covers the span from the Early Predynastic Period (ca. 4000 B.C.) to the end of the New Kingdom (ca. 1070 B.C.). The project has two primary audiences.  First, it is intended to be used within the context of a formal learning environment, specifically in an undergraduate archaeology or ancient history class setting, as a supplement to additional traditional learning materials.  Secondly, it is intended to be played by the general public, specifically the extremely large community of *Civilization* players.

The original intended outcomes of the project were threefold, and directly intended to address many of the aforementioned shortcomings of existing mainstream and serious archaeologically themed games.

The first goal was to create a game-based experience in which players explore the process of socio-historical change from the Predynastic period (ca. 4000 B.C.) until the end of the New Kingdom (ca. 1070 B.C.).  This goal was very much based on James Gee's assertion (2006) that games are best when they allow players to examine process as opposed to fact-based learning.  As such, The primary thrust of Red Land/Black Land project is not so much to create a game experience in

which players are forced restrictively relive events as archaeologists and Egyptologists believe they happened.  Instead, the game focuses on allowing players to explore the process of socio-historical change within the framework of ancient Egyptian history and archaeology.  Players are able to explore why things happened (and why archaeologists and Egyptologists believe they happened that way) as opposed to simply the facts of what happened (as they are currently understood by Egyptologists and archaeologists) – something that could easily looked up in a book on ancient Egyptian archaeology (or on Wikipedia, for that matter). An example of this comes from the early stage of the game dedicated to the rise of the Egyptian state during the Predynastic and Protodynastic periods (ca. 4500-3000 BC).  Players take part in a scenario in which the possible factors that led to the unification of the Egyptian state come into play.  If, for instance, players reach a point in the gameplay where they control Upper Egypt, would it be in their best interest to conquer Lower Egypt through direct military action, or would they rather attempt to culturally assimilate Lower Egypt through trade, peaceful colonization, and cultural exchange?  What is the results (both long term and short term) of either strategy?

The second goal of the project was to create a game-based experience in which players explore the construction of archaeological knowledge using supplementary game content that directly addresses questions of how Egyptologists and archaeologists know what they do about ancient Egypt. Continuing with the previous gameplay example, players are able to use an in-game archaeological learning agent (discussed below) to explore what Egyptologists and archaeologists know about the unification of Upper and Lower Egypt at the end of the Predynastic period. More importantly, they are also able to explore why archaeologists and Egyptologists have made those conclusions (theories and evidence), as well as possible issues with those conclusions.

The final goal, which is hardly inconsequential, was to create a game-baed experience that provides an ethical and thoughtful counterpoint to the many mainstream commercial video games which perpetuate pseudo-historical and pseudo-archaeological notions of ancient Egypt.

Ultimately, this game-based learning approach provides a far deeper and more experiential understanding of the subject material than might be gained through other, more traditional means such as textbooks and

classroom lectures. Red Land/Black Land communicates complex socio-cultural, historical, and epistemological concepts in an easily approachable and enjoyable learning experience.

## CIVILIZATION V: A PLATFORM FOR DEVELOPMENT

One of the most challenging aspects of serious game development within a scholarly context is the issue of resources and technical experience. Simply put, making games is difficult and often quite expensive. The resources that most mainstream game developers (or even small commercial developers) have are usually out of the reach for scholars in most academic environments. As a result, scholarly game projects have to make very thoughtful choices about the platforms they use for their projects. They must do a measured assessment of the technical resources at their disposal (and within their budget), and the human resources at their disposal, and make the best choices that meet the needs of their project's intended outcomes. In many ways, the Red Land/Black Land project was intended to be one model for extremely low budget scholarly serious game development.

The decision to create a mod (a mod is a "modification" of an existing game) for the Red Land/Black Land project (as opposed to building the game from the ground up) was driven by many of these resource issues. The choice of *Civilization V* as platform was driven mostly by the project's desired game mechanics, its subject and content, and its intended outcomes.

*Civilization V* is the latest version of the extremely popular series of socio-historical turn-based strategy games developed by Firaxis Games (http://www.firaxis.com/) and published by 2K Games. The game features a complex rule-based system that attempts to simulate historical, cultural, and economic change over large periods of time. As such, it is an excellent platform for the Red Land/Black Land project. In addition, and perhaps most importantly, the game has been developed (since very early in the franchise) to allow the public to create their own content in the form of mods or scenarios. For this purpose, it includes a suite of publicly available development tools with which third-party developers can modify almost all core aspects of the game, including the graphics engine, the AI engine, the rule-based system (thereby allowing a "re-write" of the aforementioned 19th century anthropological ideas that are so obvious in the game's architecture), and the game

*Civilization V features a complex rule-based system that attempts to simulate historical, cultural, and economic change over large periods of time. As such, it was ideal as a platform for the Red Land/Black Land project.*

interface itself.  In this regard, *Civilization V* does all of the "heavy lifting" (e.g. basic non-player character artificial intelligence, graphics processing, and level editing tools) for the Red Land/Black Land project. All modding in *Civilization V* is accomplished using XML and Lua, both of which are scripting languages that have a low barrier to entry and do not require anywhere near the level of experience that is required with compiled languages such as Java or C++. The modability of *Civilization V* also facilitated the development of the in-game archaeological learning agent (discussed below). In addition, newly developed mods are self contained, have a relatively small file size, and easily distributed (often through robust fan communities or a digital game distribution platform such as Steam); they only require a copy of *Civilization V* (which retails for less than $30, and is available on both Mac and PC) to play.

Ultimately, by leveraging an existing commercial game, the project was able to avoid steep development costs and lengthy development time (which would have been prohibitive given the nature of the Digital Startup Grant program), and focus tightly on meeting the project's content, play mechanics, and intended outcomes.

GAME DESIGN & DEVELOPMENT

Over the course of the project, the design team was composed of at least 3 individuals: 1 student programmer, 1 student designer, and the project director.  All game design was done collaboratively between the

student designer and the project director, with regular input and guidance from the student programmer as to any technical issues (limitations of the platform, etc.) that would have significant impact on the project.  The student designer was responsible for overseeing day-to-day design tasks. The project was very fortunate in that it were able to hire an Anthropology PhD student (Katy Meyers) who had a long interest in games (in general) and games for cultural heritage learning (in particular) to fill the role of designer. The importance of Meyers to this project simply cannot be understated.  While she did not have any previous applied game design experience, her longstanding interest in games and knowledge of archaeology (her area of research being bioarchaeology) was invaluable.

Due to the unexpected length of the project (the result of some significant logistical issues in the early part of the grant), we were not able to employ the same student programmer throughout the development.  This issue, which might have caused problems for the continuity of technical development, was at least partially mitigated by several key factors.  First, MATRIX, where the project lived, employs a very robust project management infrastructure.  Student programmers who work at MATRIX, all of which have at least several computer science classes, receive at least 3 months of training in common programming methods and best practices. This ensures that all MATRIX student programmers have at least a similar baseline set of skills.  The result is that if one leaves, another one can be integrated into the project with a minimum of complication.  This very issue came up early in the Red Land/Black Land project when the student programmer left MATRIX unexpectedly to take an internship at Microsoft.  Fortunately, another student programmer was able to join the project and pick up where the previous one left off with a minimum of problems.  Second, Meyers' work on the project remained constant. She worked directly with the various student programmers, and was able to maintain a clear and continuous design vision.

A living design document was maintained on an internal wiki and updated on a regular basis by everyone involved in the project.  TRAC was used for task management and issue tracking.  Version control on all project materials was maintained with SVN (and accessible by all members of the project, as opposed to just the programmer).

## SHIFTING PROJECT OUTCOME

As already mention, the project's initial primary goal was to create a game-based experience in which players explore (play) the process of socio-historical change from the early Predynastic period (ca. 4000 B.C.) until the end of the New Kingdom (ca. 1070 B.C.). Unfortunately, it became quite clear early in the project that this goal was simply unfeasible. While *Civilization V*'s architecture generally facilitated this sort of approach, attempting to accurately quantify and programmatically model all of the cultural, political, environmental, ideological, and economic variables for a period of more than 3000 years in the *Civilization V* engine was herculean in scale, and would have been impossible to do in the grant's relatively short time frame and fairly small budget. The result of this realization is that the project's focus shifted, foregrounding the goal of creating an engaging game-based experience in which players explore the construction of archaeological knowledge with in-game content that directly addresses questions of how Egyptologists and archaeologists know what they do about ancient Egypt.

This realization is not to say that the goal of creating an experience in which players explore the process of socio-historical change in ancient Egypt was wrong, quite the contrary. As will be discussed shortly, the progression of the gameplay remained chronological in nature. It still focused on major social, political, economic, and historical characteristics and events. However, all of this socio-historical content was designed in such a way that it specifically supported the goal of communicating the construction of archaeological and egyptological knowledge.

In many ways, this shift was liberating. The pressure to create a game with a high degree of archaeological and historical verisimilitude, which accurately modeled ancient Egyptian culture verged on debilitating. By depreciating this goal the project was able to creatively leverage the innately 19th century anthropological theory built into the very fabric of *Civilization V*. The cultural linearity, which would prove problematic if we attempted to create a cultural simulator, was used as a counterfactual foil of sorts to more effectively address the construction and development of archaeological knowledge about ancient Egypt. In addition, It allowed the project to more intensely leverage *Civilization V*'s

built in advisor system in order to construction an Archaeology Learning Agent (discussed below).

## GAME MECHANICS

As mentioned, while the goals of the project shifted, the general framework of the game remained chronologically based. Instead of creating one play experience that lasted from the Predynastic period until the end of the New Kingdom, gameplay was broken up into a series of scenarios that could be played in any order that the player wished.  Each scenario featured a clearly defined victory condition and tightly bounded parameters (such as geography, population, and resources) all of which were informed by the scenarios' specific period. The goal was not create a completely open ended play experience that stretched over 3000 years (in-game time), but to create an experience grounded in archaeology and Egyptology, and tightly focused on addressing the project's primary goal: creating an experience in which players explored the construction and evolution of archaeological and egyptological knowledge.

In-game scenarios (and associated win conditions) included the following:

*Predynastic (Win Condition: Unify Upper and Lower Egypt)*

The scenario requires the player to build enough of a military force to conquer other chiefdoms, or enough force to use puppet-states, or gain their favor through gifts to become allies. Construction of strong ideology aids in gaining allies, as will the development of writing.

*Old Kingdom (Win Condition: Construct a Pyramid)*

This scenario challenges players to gain enough power over other nomarchs (governors) in order to acquire worker units for the pyramid construction project. It also requires a high amount of money, and development in the science arena enough that you can build a proper pyramid. The scenario also requires players to initially a step pyramid and a queen's pyramid. Player also have the option to gain influence over nomarchs by conquering, controlling or winning favor. Happiness must be high in order for workers to continue working on the pyramid

*Red Land/Black Land was broken into a series of chronologically-based scenarios*

construction project. Building temples makes workers happier as well as shortening their period of time required to complete the pyramid construction project.

*First Intermediate Period (Win Condition: Re-Unify Egypt)*

This scenario requires players to build up enough of a military for to conquer other nomes (provinces).  Alternatively, players can gain the allegiance of nomarchs through gift giving. In this scenario, construction of a state ideology and propaganda machine is particularly important.

*Middle Kingdom (Win Condition: Expand into Nubia)*

This scenario requires player to conquer, control, or ally with the Medjay, Kerma, and a number of Nubian polities.  In order to accomplish this, the player can construct a series of fortresses along the Nile.

*Second Intermediate Period (Win Condition: Re-Unify Egypt and Expel Hyksos)*

In this scenario, players must ally with other nomes in order to conquer Avaris, the capital of the Hyksos.

*New Kingdom (Win Condition: Expand Influence Beyond Traditional Borders)*

In this scenario, players are challenged to expand political influence beyond the country's traditional borders and gain positive influence or

military control with all neighboring countries including Kush, Hittites, Hyksos, and Libyans. In order to accomplish this, players need to have a strong military, strong bureaucracy, large amount of money, and control trade routes.

In each scenario, players are greeted by an introduction that provides cultural and historical context for the gameplay. For instance, in the case of the Second Intermediate Period scenario, players are greeted with the following text:

*The kingdom of Egypt is once again divided by the rise of provincial rulers. However unlike in the First Intermediate Period, a foreign power has taken control of Lower Egypt - the Hyksos.*

*With the end of the twelfth dynasty, a lack of successors meant there was a power struggle over the throne. The inability of the thirteenth dynasty to maintain control led to the division of Upper from Lower Egypt, with the rise of a separate fourteenth dynasty in the South. In the North, the fifteenth dynasty was founded by invaders from Western Asia, the Hyksos. The word Hyksos in Egyptian means "rulers of foreign countries", an apt title for these foreign conquerors. Through Egyptian vassals, the Hyksos have successfully gained control over the Northern parts of the kingdom. Unrest is brewing in Thebes, however, and murmurs of weakness in the Hyksos rulers have begun to spread.*

*It is upon you, Ahmose I, to found the eighteenth dynasty and rid Egypt of this foreign scourge. Once again, our kingdom must be united and the invaders cast out. You will need to gain the support of the other provinces of Egypt, especially those in the South. You must also defeat the Hyksos and drive them out of Egypt. Only then will our kingdom once again be unified.*

**IN-GAME ARCHAEOLOGY LEARNING AGENT**

Perhaps the most important aspect of the project are the in-game Archaeology Learning Agents. *Civilization V* already provides a useful model for pedagogical guidance through its "advisors." These advisors provide summary data and advice to players about a course of action based on their focus (e.g. there is a military advisor, an economic one, etc.). We extended and enhanced the existing advisor system to create a variety of in-game Archaeological Learning Agents, each with specific characteristics, motivations, background, and perspective on the content.

The in-game Archaeological Learning Agents included the following (note their disciplinary background expertise, and period):

*19th Century Archaeologist*: takes a more classical perspective using evolutionary and economic viewpoints, with a heavier focus on monuments, pottery, and grave goods. The 19th Century Archaeologist tends to give more advice about grander finds, and believes older methods like seriation yield more accurate results

*21st Century Archaeologist*: focusses on modern interpretations, will focus on newer techniques taking a variety of theoretical approaches, and will doubt validity of data, uses new technique, more advice about domestic settings

*Egyptologist*: covers Egyptian history from an epigraphic and historic perspective, focuses more heavily on written data as the best source of evidence

*Graduate Assistant*: covers a number of research perspectives and serve as 'jack of all trades', random knowledge on faunal and human remains, pottery, hieroglyphics, spatial information, and anything else that is relevant

In order to extend this model and provide additional entertainment and engagement each of the Archaeological Learning Agents has a details

biography (which occasionally is shown in the context of the content they deliver):

*Gordon Peatree (19th Century archaeologist)*: He attended University of Cambridge, and was funded by the Egyptian Discovery Endowment to investigate pottery in Egypt. His work on seriation of ceramics is known throughout the world, and has a number of impressive finds, including numerous tombs and caches of artifacts. His work has been summarized in a massive tome titled "Strangers in the Black Land: The Role of Migration, Diffusion and Foreign Invasion in Ancient Egypt" which reiterates his theory on the importance of foreign influence in the rise of Egyptian culture. Dr. Peatree primarily uses ceramics and religious excavations as evidence, with a strong emphasis on the role of diffusion as a mechanism for change.

*Evie Danielson (21st Century Archaeologist)*: After receiving both her BA and PhD at University of Chicago, she began a number of highly successful field seasons excavating predynastic households throughout Upper Egypt. She now runs a field school for his students creating digital maps of ancient domestic sites in Egypt. Her most recent publication was titled "Digital Black Lands: Using Technology to Reconstruct Ancient Egypt" which deconstructs texts and inscriptions by using archaeological evidence and new technological methods to understand what actually occurred. Dr. Danielson uses domestic sites and a range of evidence, taking a scientific method approach towards excavation.

*Hazi Wawat (Egyptologist)*: He received his BA from Alexandria University and then pursued a PhD at Cairo University. He is most famous for his work on epigraphy, the study of inscriptions, and papyrology, the study of papyrus, titled "The Stylus is Mightier Than the Spade". In this work he argued his primary philosophy, that texts are more representative and truthful of the past than artifacts and archaeological sites, which are obscured over time and biased by selective excavation. Dr. Wawat uses primarily inscriptions, epigraphy, papyrus, hieroglyphs and pictographs to create interpretations of Ancient Egypt.

*James Herbert (Graduate Student)*: He is a PhD student at the American University at Cairo studying mortuary practices of Predynastic and Old Kingdom Egypt. His Masters from University of St. Andrews focused on

disease and work-related pathology in a skeletal remains from a worker's cemetery near the Valley of the Kings. He now works as a research and teaching assistant to Dr. Danielson, attempting to balance his own research while also keeping track of the twenty undergraduate students during the field school.

At key points in the game, the Archaeological Learning Agents appears up to provide the player with contextual information about in-game events.  An example of this is in the New Kingdom scenario when the player comes in contact with Nubians:

Gordon Peatree: "Similarity in the pottery and designs of Egypt and Nubia show that there was a lot of cultural diffusion between the two groups. Interacting with them will be beneficial to our own growth."

Evie Danielson: "Evidence from the archaeological site of Tombos shows that Egypt had military control over Nubian cities, although there is debate whether Egyptians ruled there or if they incorporated Nubians into their elite to be rulers."

Hazi Wawat: "Papyrus documents from Egypt talk of Ahmose's conquest of Nubia: "King Djeserkare, the justified, when he sailed south to Kush, to enlarge the borders.""

James Herbert: "Viewpoints of the Nubians are strongly biased because the records we have are mainly Egyptian. In the past they have been characterized as frontier barbarians, savage primitives and at the other extreme as overly decadent and fully Egyptian based on the changing interpretations of their origins and leaders."

## IN-GAME CONTEXTUAL LEARNING CONTENT

In addition to the content delivered by the various in-game Archaeological Learning Agents, players are provided information about various sites (and the associated archaeological research that has been carried out at the site).  For instance, in the Middle Kingdom scenario, when players locate the site of Hawara, they are provided the following information in form of a pop-up:

*Hawara is located in Upper Egypt, and contains the pyramid complex of 12th dynasty king Amenemhat III and Princess Neferuptah. It also contains a cemetery dating from the Late Middle Kingdom to the*

*Roman period. The funerary complex of Amenemhat III is the most elaborate and extensive of the Middle Kingdom, and is strongly influenced by Old Kingdom funerary complexes. The complex consists of a mud-brick pyramid with an outer casing of limestone. Within the pyramid there were a number of innovations such as sliding portcullises to block off corridors, and a different floor plan to increase protection. The tomb of the princess however was badly damaged, but the burial chamber below ground was still intact, including her sarcophagus.*

*Excavations at the site were primarily done by Flinders Petrie in 1888. The site was highly damaged by stone robbing, and descriptions of the pyramid from Roman historians wasn't enough to reconstruct it. Petrie was able to recover a number of papyri from the Old Kingdom, and 146 portraits from Roman coffins, but little of the Middle Kingdom site. The tomb of Neferuptah was excavated in 1956 by Farang and Iskander. They were able to recover the princesses's sarcophagus and funerary equipment, although it had been damaged by ground water.*

## GAME DESIGN AS EDUCATION & CAPACITY BUILDING

One of the unanticipated side effects of the project is that it served as an opportunity to build technical capacity among student domain experts and domain knowledge in student programmers.  On one hand, the project programmers were exposed to ancient Egyptian archaeology and history.  In fact, one of the tasks that the student programmers were required to undertake was to read Kathryn Bard's *Introduction to the Archaeology of Ancient Egypt* volume. This provided them with at least a

rudimentary contextual understanding of the game design decisions that were being made and which they were required to implement.

On the other hand, Katy Meyers (designer, PhD student in Anthropology) had the opportunity to learn the fundamentals in game design, skills which will undoubtedly serve her well as she continues to have a committed scholarly interest in serious games and meaningful play for cultural heritage learning, outreach, and engagement.

As such, the project, even at this small scale, was important as it served as a vehicle to build both technical capacity and domain knowledge among students who might not have otherwise acquired such knowledge.

## TESTING, DEPLOYMENT, AND DISTRIBUTION

The game materials (design document, etc) were subjected to both internal (by the members of the project) and external (by members of the advisory board) formative evaluation. In addition, once the game had reached a stage at which it was playable, it was regularly subjected to internal playtesting. The results of both formative evaluation and playtesting were iteratively cycled into the game's design and development. Unfortunately, due to time constraints and budget, the game was only able to reach an Alpha stage.

The game was tested as supplementary material in Watrall's ANP455: Archaeology of Ancient Egypt class in the summer of 2012. Unfortunately, the supplementary nature of the materials (within the context of the class) and the fact that only several students already owned a copy of Civilization V made comprehensive assessment of the game within the context of a formal learning environment difficult. Those students that did use the game during class enjoyed the experience. More generally, they appreciated the idea of game-based learning within an archaeology class (or any university class, for that matter).

The game was made available in several locations. First, a copy of packaged mod was made available through the MATRIX website (specifically games.matrix.msu.edu). In addition, it was made available on CivFanatics (www.civfanatics.com), one of the most active Civilization user communities.

While not accomplished during the period of the grant, all of the source files for the project will be made available on GitHub in the near future. The idea in this regard is that development can be continued by anyone in the academic game design community or the thriving Civilization mod community. In addition, other academic game development projects who are interested in *Civilization V* as a development platform can use the Red Land/Black Land source files to advance their project more quickly or to avoid mistakes.

## CONCLUSIONS & FUTURE DIRECTIONS

We began this project with the belief that games (digital or not) could play a central and powerful role in a teaching and learning ecosystem (formal or informal). This belief was particularly fierce in the context of archaeology, a domain that, as mentioned previously, lends itself quite easily to such game friendly themes and design models as exploration and discovery.

The challenges of game design, either within the domain of archaeology or within a more general scholarly context, however, are quite high. We were fortunate in that MATRIX has significant resources for project management and development (both human and technical). However, many other institutions do not have similar resources. The result is that game design projects might be out of the reach for many scholars.

Modding an established commercial game is a solution to many of these issues. There is no doubt that within the context of the work described herein, *Civilization V* served as a relatively accessible platform for game development (especially within the context of the Red Land/Black Land project focus). However, there are still significant challenges. Even if the mod is made available for free, players might still have to buy the game itself to run the mod (which, in the case of *Civilization V*, costs roughly $30). In addition, required system specifications for the computer on which the game is played might prove a barrier for broad use and adoption. How could a game be used in a formal learning environment if students simply do not have computers that meet the minimum system requirements?

This is not to say that we feel scholarly game design is impossible, quite the opposite. Instead we feel that scholarly game projects need to be

mindful of the implications of choosing one platform over another, especially in regards to audience and accessibility.  Scholars should also be wary of falling under the glamour of mainstream, AAA commercial games. The budgets and resources involved in these games are far out of our reach.  Instead, scholars interested in game design projects should adopt a more flexible idea as to the notion of game-based learning and meaningful play. Avenues such as mobile play, alternate reality games, browser based games (developed in HTML5, for instance) might prove to be both more attainable from a resource standpoint and equally (or perhaps more) engaging.

We do feel very strongly that the scholarly game design process can serve as an excellent teaching tool.  In the context of this project, one could easily imagine game design assignments using *Civilization V* in an archaeology class. So, instead of the finished game being the primary platform for outreach and engagement, the process of designing the game becomes the vehicle for teaching student about archaeology, archaeologists, and the human past.

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